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AN INVESTIGATION OF THE DIFFERENCES IN ORAL READING BEHAVIOUR BETWEEN GOOD AND POOR READERS

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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ABSTRACT

This study examined the differences in oral reading behaviour between good and poor readers. Oral reading miscues were analysed in order to get an indication of the strategies used by these proficiency groups in processing print.

From three schools in a large, Western Canadian city, a test population of 61 grade four students and 100 grade six students was administered the New Developmental Reading Test, Form A(1968). Those students from the test population who had a grade-equivalent General Comprehension score on this test of 4.0 to 5.5 were selected from the population. Scores on the Canadian Lorge-Thorndike Intelligence Test, the Weschler Intelligence Scale for Children, and the SRA Primary Test of Mental Abilities were used to screen subjects for the sample, so that those students scoring below 80 or above 110 were excluded. Fifteen sixth graders then formed the group of poor readers and 15 fourth graders comprised the group of good readers.

Two passages from the Reading Miscue Inventory (1972) were administered to the test sample. The first 50 oral reading miscues from each subject were analysed into eleven categories to determine oral reading accuracy, use and integration of information from the graphic, syntactic and semantic cue systems, and correctional behaviour.

The statistical treatment of the data included t-tests, F-tests, and Pearson product moment correlation coefficients.

The findings revealed that there were no significant differences between good and poor readers in the number of errors made

per hundred words, in the amount of information used from the specific cue systems, or in the integration of information from two or more of the cue systems. Significantly more variability was noted, however, in the scores of the poor readers in the category assessing the integration of graphic, syntactic and semantic information. This suggests that integration may be a problem for some of the poor readers.

On the correctional variables, good readers were found to make significantly more corrections than the poor readers, particularly on errors which were not acceptable with the passage meaning. These findings were confirmed in the results from the correlations. Good readers had three times as many significant relationships among the variables. Moreover, integration of syntactic and semantic information was positively related to reading comprehension, while integration of information of all three cue systems was positively related to correctional behaviour. These relationships were not significant for the poor readers. These findings suggest that the good readers have developed strategies to enhance their ability to reconstruct the author's intended meaning of a passage.

The results of this study have implications for the diagnosis of problem readers and the teaching of reading.

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Chapter 1

THE PROBLEM

INTRODUCTION TO THE PROBLEM

During the past decade, reading has come to be viewed by many theorists as a complex language-processing activity rather than a word perception task. Clay, Goodman, Weber, and others have suggested that three kinds of information are processed in the reading task: the graphic information from the page of print, the reader's knowledge of language patterns (syntax), and the reader's knowledge of relationships in the real world (semantics). Research on oral reading has suggested that as soon as children begin reading, they attempt to use all three types of information.

Although theorists view reading as a language-processing activity, most reading programs appear to assume that reading is comprised of a set of subskills to be mastered. The majority of remedial programs appear to make a further assumption that a major difference between good and poor readers is in the knowledge of these subskills. Emphasis accordingly has been placed on the reteaching of subskills.

Unfortunately, results from research on the long-term effectiveness of such remedial programs are not promising. Several studies (Balow, 1965; Buerger, 1968; and Muehl and Forell, 1973) have reported short-term gains following remedial instruction; poor readers increased their level of reading achievement and their rate

their classmates. Consequently, comparisons with control groups showed no statistical difference in level of reading achievement between those subjects who received treatment and those who did not. Balow has suggested that much of the belief in the effectiveness of remedial reading programs was a matter of faith rather than proven success. Since the long-term results of remedial programs have been largely unfavourable, perhaps the underlying assumptions of such programs should be questioned.

Early studies of the oral reading behaviour of good and poor readers suggested that there may be differences in the way good and poor readers process information as they read. Swanson (1937) and Fairbanks (1937) found differences between proficiency groups on the number of errors made which altered the meaning of the passage (poor readers made more), and in correctional behaviour, with good readers correcting almost three times as many errors as the poor readers.

More recently, studies of the oral reading behaviour of good and poor readers have been conducted within the framework of reading as a language-processing activity (Brody, 1973; Goodman and Burke, 1973; Jensen, 1972; and Pacl, 1977). However, many of the results of these studies are inconclusive since, in all but one case, the sample sizes were too small to use statistical analysis. Nonetheless, some tendencies have been cited with the most frequent one being that poor readers, while able to integrate graphic and syntactic information, were less able to integrate semantic information with information from the other cue systems (syntactic and grapho-phonic). Guthrie

(1973), as well, found a lack of interfacilitation of reading subskills for poor readers, confirming the suggestion that integration of information may be a significant problem for poor readers.

It appears, then, that there may be differences in the way good and poor readers process information as they read. What is needed now is research which systematically studies differences between good and poor readers. This need has been identified by Venezky, Massaro, and Weber (1976), who suggest that information found will assist in the diagnosis and remediation of poor readers, and will test the generalizability of the model of the successful learner.

This study is an attempt to respond to this need by systematically comparing the oral reading behaviour of average fourth and poor sixth-grade readers. To avoid the pitfalls of much research conducted in this area (Samuels, 1973), the study will attempt to control for the level of reading achievement of the subjects in each group and the range in intellectual ability.

PURPOSE OF THE STUDY

This study was designed to compare the oral reading behaviour of good (average fourth-grade readers) and poor (low sixth-graders) readers having the same level of reading achievement. The purpose was to analyse oral reading errors to determine differences in the amount of information used from three cue systems by good and poor readers, and in their abilities to integrate information from two or more cue systems simultaneously. In addition, the number of errors

made per hundred words and the correctional behaviour of the two groups were analysed.

DEFINITION OF TERMS

The following terms used in this study are defined as follows:

Graphic Information - refers to the letters, spelling patterns and patterns created through white space and punctuation (Goodman, 1970).

Grapho-phonic (graphophonemic) Information - refers to the relationship between the sounds of the language and their graphic representations.

Syntactic Information - refers to the reader's knowledge of the patterns of the English language.

Semantic Information - refers to the body of knowledge that the reader brings to the reading act, including his vocabulary, concepts, and background experience.

Cue Systems - refers to those classes of information used in the reading process -- grapho-phonic, syntactic and semantic.

Good Readers - are those students in grade four scoring between 4.0 and 5.5 on the General Comprehension score of the New Developmental Reading Test (1968), Form A.

Poor Readers - are those subjects in grade six scoring between 4.0 and 5.5 on the General Comprehension score of the

New Developmental Reading Test (1968), Form A.

Reading Comprehension - is viewed as the ability of the reader to reconstruct the author's intended meaning. It is operationally defined in this study by the grade-equivalent score attained on the General Comprehension rating of the New Developmental Reading Test (1968), Form A.

HYPOTHESES

On the basis of results of studies reviewed in chapter two, the following research hypotheses were formulated and tested:

Hypothesis 1.10

The good readers will make significantly fewer miscues per hundred words than will the poor readers.

Hypothesis 2.10

The good readers will make significantly more of each of the following types of errors than will the poor readers:

2.11 errors with high graphic similarity to the expected response,

2.12 errors which produce a syntactically acceptable sentence,

2.13 errors which are semantically acceptable in relation to passage meaning.

Hypothesis 3.10

The good readers will be able to integrate information from the cue systems to a significantly greater degree than the poor readers in terms of

3.11 the number of errors which have high graphic similarity and are semantically acceptable,

3.12 the number of errors which have high graphic similarity and are syntactically acceptable,

3.13 the number of errors which are semantically and syntactically acceptable,

3.14 the number of errors which have high graphic similarity and are semantically and syntactically acceptable.

Hypothesis 4.10

The good readers will make significantly more corrections than will the poor readers in terms of

4.11 the total number of errors which are corrected,

4.12 the type of errors which are corrected with regard to

(a) the proportion of graphically dissimilar errors which are corrected,

(b) the proportion of syntactically unacceptable errors which are corrected,

(c) the proportion of semantically unacceptable errors which are corrected.

The decision point adopted for all analyses in the study is $p < .05$.

SIGNIFICANCE OF THE STUDY

It has been suggested by some researchers that the problems of the poor reader may involve the inability to integrate information

rather than a lack of it. If it can be shown that poor readers, compared with good readers having the same level of reading achievement, process print differently, then this would suggest that the emphasis in remedial and in developmental reading programs be changed significantly. Instead of focussing on isolated reading skills, the programs would emphasize the integration of information and skills.

Previous studies comparing the oral reading errors of good and poor readers have had small sample sizes (six or fewer subjects per group). Hence, it is not known whether the differences identified between the good and poor readers in their use of specific cue systems are significant. This study is using sufficient sample sizes to permit the use of statistical treatment of the data.

Since the effects of remedial programs appear to be questionable, and yet considerable time, effort, and funds are being channelled into school systems and private clinics, information which would lead to more effective remedial programs is greatly needed.

LIMITATIONS AND DELIMITATIONS

The following limitations and delimitations should be observed when considering the findings of the study:

1. Since it was not possible to evaluate the strategies used in the reading of correct responses, the cues that the readers used were inferred by examining words read incorrectly. The assumption thus has been made that the reader uses the same strategies when making correct and incorrect responses.

2. An oral production was necessary in order to obtain a measure of information used from the three cue systems. The results will only be valid to the extent that an oral response is an accurate indicator of the cues actually used by the reader.

3. The sixth-grade readers may have been at a disadvantage in an oral reading situation, as oral reading may not be as common a school experience for grade six students as it is for grade four students.

4. Due to the nature of the sample, the generalizations that can be made for a representative sample of fourth and sixth-grade students are limited.

5. The methods of reading instruction (phonics, sight, language experience, eclectic) that individuals had were not controlled for in the study, and may have been a significant factor in the subjects' use of cue systems.

6. Because three of the thirty subjects were assessed on measures of intellectual ability other than the Canadian Lorge-Thorndike Intelligence Test , this factor may not have been adequately controlled in this study.

PLAN OF THE INVESTIGATION

The investigation is reported according to the following plan. Chapter two will present the theoretical framework on which the study is based and a review of related literature on oral

reading behaviour. Chapter three will describe the experimental design of the study. An analysis and discussion of the data will be presented in chapter four. Chapter five will include a summary of the study, the major conclusions, and a discussion of the findings in relation to previous research. Implications for diagnosis and reading instructions, and suggestions for further research will also be presented in chapter five.

Chapter 2

REVIEW OF RELATED LITERATURE

The main purpose of this study was to compare the oral reading behaviour of good and poor readers. This section will first present the theoretical basis on which the study was founded, and secondly, will review research on oral reading behaviour. The discussion of research will be divided into three sections: those studies focussing on beginning readers, those on proficient readers, and those comparing good and poor readers.

THE THEORETICAL FRAMEWORK

Many of the earliest studies of oral reading behaviour were based on a theory of reading which assumed that the unit being processed by the reader was the word. Accordingly, this research focussed primarily on the graphic information used by the reader. However, theorists and researchers more recently have come to view reading as a complex language-processing activity, in which the reader is actively engaged in reconstructing the author's meaning.

K. Goodman (1970) has constructed a model of reading which assigns such a role to the reader. Viewing reading as a psycho-linguistic process, Goodman suggests that the reader has available simultaneously three kinds of information. These are: (1) grapho-phonic information, including knowledge of letters, sounds, and sound-symbol relationships, (2) syntactic information, including knowledge of sentence patterns, pattern markers (e.g. function words, inflections,

punctuation, and intonation), and transformation rules, and (3) semantic information, including the reader's sum total of experience, his concepts of the world, and his vocabulary.

K. Goodman has also identified a series of processes, which he feels are involved in successful reading. The reader must be able to scan the page of print, focus on a line of print, and select from the graphic display cues that will be most productive in order to form a perceptual image. Having formed an image, the reader must be able to search in memory for phonological, semantic, and syntactic information associated with the image. With this information, the reader makes a tentative choice which is evaluated for semantic and syntactic appropriateness. If the choice has not made sense, the reader must be able to scan back over the material to gather more grapho-phonic information. When an acceptable choice has been made, the reader must be able to integrate this information with the interpretation of the passage, which has been forming, by the processes of assimilation or accommodation.

Like K. Goodman, Ryan and Semmel (1969) have considered reading as a language-processing activity and have suggested that the reader does not need to identify every printed unit (letter or word) from the page in order to be able to interpret the intended meaning of a passage. Instead, they postulate that the reader, having sampled cues from the text, uses his cognitive and linguistic knowledge to reproduce a probable utterance. This prediction is then checked for appropriateness by sampling further cues available in the text.

Smith (1971) also works within a psycholinguistic framework but, in addition, relies on information processing theory to describe

reading. He postulates that the reader uses two types of information, 'visual' and 'non-visual' information. The 'visual' information is defined by Smith as printed marks on the page, while 'non-visual' information is defined as the reader's cognitive structure, consisting of the reader's knowledge of language and of relationships in the world. Smith suggests that the relationship between 'visual' and 'non-visual' information is reciprocal in that the more knowledge a reader can bring to the page of print, the less he need rely on the 'visual' information. Fluency, Smith goes on to suggest, depends on less and less reliance on the 'visual' information.

The above theorists have viewed reading as an interaction between the reader and the graphic stimulus. The information that the reader brings to the page, including his conceptual basis and knowledge of language, in conjunction with selected cues from the graphic display enable him to formulate hypotheses about meaning. These hypotheses are then judged for appropriateness. This view of reading as an active reconstructive process provides the framework on which this study is based.

RESEARCH ON ORAL READING BEHAVIOUR

Early research in oral reading tended to be designed for one of two distinct purposes. The first was to evaluate reading skill, to diagnose weaknesses, and to indicate a starting point for remediation (Monroe, 1928). The second, of more relevance to this study, was research conducted in an attempt to gain insights into reading processes. An assumption made was that oral reading errors could provide an indication of information the reader was attempting to

exploit, and reveal strategies generally used by the reader. The view that oral reading errors are one way to gain insights into reading behaviour is held by many current researchers. The Goodmans (1965) have termed oral reading miscues windows on the reading process.

The research on oral reading behaviour reviewed in this chapter will be discussed in three sections. Studies concerned with beginning readers will be presented first, followed by reviews of studies on proficient readers and then studies comparing good and poor readers.

Studies on the Oral Reading Behaviour of Beginning Readers

Several researchers have investigated the oral reading behaviour of first-grade children. Results from selected studies at this level will be reported in this section.

Most early research on oral reading behaviour was concerned with poor readers. However, in 1959, MacKinnon acknowledged beginning reader's use of grammatical constraints. From an examiration of anecdotal notes in first graders' reading profiles, MacKinnon reported that many of the children's errors were dependent upon the grammatical structure, rather than the graphic form. In addition, he found that some readers made a second error consistent with a previous one made in the sentence, suggesting that the children were processing units larger than the word.

While MacKinnon's findings indicated beginning readers' use of syntactic information, other researchers have devised more systematic methods to permit the investigation of beginning readers' use of all three cue systems -- grapho-phonic, syntactic and semantic.

Clay (1968) examined the oral reading of 100 first graders over the period of one year. Weekly records were maintained of each child's attempts to read. A word identification task administered at the end of the year was used as the basis for forming four groups - high (H), high-medium (HM), low-medium (LM), and low (L). The error rates for these groups were: one error per 100 words for the H group; one error in 15 words for the HM group; one error in eight words for the LM group; and one error in every three words for the L group. The observations from the book-reading stage showed that there were significant differences between groups in correctional behaviour: the H group corrected one in three errors; the HM group corrected one in four errors; the LM group corrected one in eight errors and the L group corrected one in twenty errors. Clay suggested from the results that the H group made few errors and were able to relate all incoming information (syntactic, semantic and graphophonic) efficiently. The HM group, having made errors, managed to correct many of these by integrating the information from the three cue systems. Though the LM group attempted to relate cues, their many errors created confusion so the errors were hard to detect. The L group made little effort to relate or cross-check cues.

Another longitudinal study of beginning readers was conducted by Weber (1970), who analysed the daily reading errors of a first-grade class from December to June. The sample was divided into a high reading group and a low reading group on the basis of the classroom teacher's groupings. The erroneous responses were evaluated for graphic proximity to the stimulus, semantic acceptability, and grammatical acceptability. Differences between the high and low groups appeared in several areas.

The high group made 3.9 miscues per hundred words, while the low group made 6.7. With regard to graphic proximity (based on a complex formula which took into account position and number of shared letters, average length of words, etc.), better readers more closely approached the correct response than did the slower readers. For both high and low groups, a large percentage of errors was grammatically appropriate to the preceeding context. Over the time period, there was an increase in the use of graphic information for the whole class, but a decrease in the percentage of grammatically acceptable errors. Since this drop was due to the performance of the lower group, Weber suggested that, in attending to more graphic information, the lower group was unable to integrate both cue systems at the same time.

While both Clay (1968) and Weber (1970) analysed the reading behaviour of a class of first-grade children, Y. Goodman (1967) investigated the oral reading behaviour of six beginning readers for nine sessions from January to November. The children's miscues were recorded and analysed according to a taxonomy which examined the miscues in terms of (1) levels of cue systems within the language, (2) how the miscue was treated once it was produced, and (3) types of miscues. In addition, a comprehension rating was included, which evaluated the subject's retelling of the story. Corrections and regressions were also analysed. Goodman noted several phenomena related to beginning readers: all beginning readers make errors; the more miscues per hundred words committed, the lower the percentage of corrections made; adequate comprehension was attained within a range of miscues from five to fourteen per hundred words; all cue systems (syntactic, semantic, and graphophonic) were in operation for all beginning readers

to some extent; miscues more often resulted in syntactically acceptable than semantically acceptable errors; and the syntactically acceptable errors were more frequent at the sentence rather than the phrase level. In terms of development over the period of the study, Goodman found the following results. The percentage of substitutions did not change but there was an increase of graphic and phonemic proximity as the readers became more proficient. There was also an increase in the percentage of omissions which produced acceptable structures. Indeed, with all types of errors, as beginning readers became more proficient, there was an increase in the percentage of errors which did not change the syntax or the meaning. Comparing the better readers and the slower readers, Goodman found the better readers had finer discrimination of sound-symbol relationships, made fewer regressions, and produced a greater percentage of errors that were syntactically and semantically acceptable (50 percent versus 30 percent).

Specifically interested in the integration of graphic information and contextual constraints, Biemiller (1970) investigated the oral reading errors of 42 first graders from October to May. The taxonomy used was not as elaborate as those of Clay, Weber, or K. Goodman. Errors were analysed in terms of contextual constraints (did it make sense in terms of previous material) and graphic constraints (the graphic proximity of the error to the printed stimulus). Three main phases of development were recognized: phase one, characterized by a predominance of contextually constrained errors; phase two, characterized by a predominance of no-response errors and an increase in graphically constrained errors; and phase three, characterized by a co-occurrence of contextually constrained and

graphically constrained errors. The children who used the context and were unable to use the graphic information were the poorest in the study.

Biemiller's stages of reading were determined in a longitudinal study of first graders' reading behaviour. A follow-up study was conducted by Flemming (1974) to investigate the possibility of being able to place first graders into hierarchical stages similar to Biemiller's on the basis of oral reading miscues from one observation. Forty grade one students of varying levels of reading achievement comprised the test sample. The results confirmed that it was possible to place children into discrete stages on the basis of one testing session. These stages were comparable to those of Biemiller except that five stages were identified instead of three. In addition, a comparison of high and low readers' use of syntax at the post phrase level (characterized by a co-occurrence of graphically and contextually constrained errors) showed that high readers were better able to use this portion of context (syntax) than were the low readers.

These studies concerning the oral reading behaviour of beginning readers have supported the view of reading as a language processing activity, and have shown that beginning readers use graphic, syntactic, and semantic information as they read. In addition, differences in beginning readers evident at the end of first grade were found in the amount of information used from the graphic display, in the number of errors made per hundred words, in the ability to detect and correct errors, and in the ability to integrate information from the three cue systems.

Studies on the Oral Reading Behaviour of Proficient Readers

This section reports on selected research studies on average or above-average readers from grade two to adulthood.

While much of the early work on the analysis of oral reading errors involved poor readers, Payne (1930) was one of the few researchers to consider proficient readers. She analysed 10,000 responses of students from grade two to five to tachistoscopically presented lists of words and phrases. Results indicated that responses to unknown words were modified by the reader's sight vocabulary, words known starting with the same letters, words similar in configuration which were being taught at the same time, and the context in which the words were presented. These results suggested that the reader's background knowledge and prior experiences with reading modify reading behaviour.

The importance of non-print information in reading processing was the primary concern of K. Goodman in 1965, when he defined reading as "a psycholinguistic process which [was] cued or miscued during the child's interaction with written language" (p. 649). Goodman hypothesized three cue systems used by the reader: (1) cue systems within words (word analysis skills), (2) cue systems within the flow of language (knowledge of language patterns), and (3) cue systems within the reader's past experience and conceptual framework. Goodman reported a descriptive study of the oral reading of first, second, and third graders. The subjects read words in lists and then passages based on the word lists. The subjects were also asked to retell the stories as well as they could. Results indicated that the children could identify many words in context that they could not identify from the

lists. Moreover, this ability increased with years in school; first graders read almost 66 percent of the words in context that they had missed on the lists, the second graders 75 percent, and the third graders 82 percent. In addition, as the children progressed in school, they appeared better able to use word analysis skills, or the cues 'within words'. Finally, Goodman found that virtually every regression made by the subjects was for the purpose of correcting previous errors. He also found that errors were left uncorrected if the error made no difference to the meaning of the passage, or if the reader was relying so heavily on word analysis skills (cues within words) that he lost the meaning entirely.

Interested in the effects of syntax on reading errors, Morton (1964) studied the oral responses of adults to texts having various degrees of approximation to English (e.g. "I heart" and "are we marriage"). The errors were classified as omissions, insertions, and errors showing the influence of previous or subsequent words. The findings suggested that errors involved an effort to produce grammatically acceptable patterns.

Also concerned with the reader's use of syntactic information, Nurss (1969) hypothesized a relationship between oral reading errors and syntactic complexity. She analysed the oral reading errors of two groups of second-grade students. One group had been screened on the vocabulary used in the test instrument, while the other group had not. The passages read were six one-sentence stories, the complexity of which was determined by Allen's sector analysis (Allen, 1962) as being high, medium, or low. The responses were categorized as self-corrections, hesitations, and other errors (substitutions, omissions,

etc.). The other errors were judged on whether or not they 'made sense' grammatically and semantically. Results showed that both samples of children made more errors when reading more complex sentences. When the uncorrected errors were judged in terms of 'making sense', the results indicated that errors more frequently made sense in sentences with low syntactic complexity. Children were also found to be more likely to pause at appropriate grammatical boundaries in less complex sentences.

Beaver (1969) postulated a theory of reading based on transformational grammar where the reader decodes to deep structure and encodes back again for an oral production. He hypothesized that if a reader changed the syntax he would choose a simpler rather than more complex form. Beaver then analysed uncorrected 'reading lapses' (errors) of 30 students ranging from grades one to nine. He categorized lapses into phonological and syntactic classes. Only one fourth of the errors could be classed as phonological and these occurred primarily at the earlier grades. Syntactic mismappings all produced simpler structures, but frequently produced structures which were "semantically anomalous" (p. 169). Beaver concluded that the reader's attempt to simplify syntax interfered with phonological mappings and concern for meaning, i.e. "the reader's syntactic component [was] turned on and his semantic component [was] turned off" (p. 169).

While most of the above researchers explored the reader's use of one or more cue systems (grapho-phonic, syntactic, and/or semantic), the taxonomy devised by K. Goodman was designed to investigate the interrelationships of the three kinds of information. The findings

of three studies based on this taxonomy indicate some developmental trends in oral reading behaviour as readers become more proficient.

The first study reported by Goodman and Burke (1968) analysed the miscues of 12 proficient readers from grades four and five which were generated while reading a sixth-grade passage. (Proficient was defined as scoring one or more grades beyond class placement on a reading test.) The second study (1969) examined the oral reading miscues of 18 proficient readers from grades two, four, and six reading passages at the fifth, sixth and eighth-grade levels, respectively. The 1973 report was a compilation of research on the miscues of samples of low, average, and high proficiency readers from grades two, four, six, eight, and ten. The total sample was comprised of 94 subjects. Each group of readers was given a passage of appropriate difficulty to read in order to generate sufficient miscues.

The findings from these three reports are summarized here. Goodman's theory of reading was supported in all cases, as the analysis of miscues revealed the interplay of information from the three cue systems -- syntactic, semantic and graphophonic (1968, 1969, 1973). The number of miscues per hundred words (MPHW) remained constant as readers increased in age, though the means for the proficiency groups differed [high, less than 5 MPHW; average, 5 MPHW; and low, 10 to 12 MPHW (1973)].

All readers used information from the three cue systems in varying degrees. In terms of graphic information, there was little difference in the amount used by different grade levels or proficiency groups, except for the low grade two subjects, who used considerably

less information. Phonemic proximity at all grades and levels of proficiency was lower than graphic proximity of miscues (1969, 1973).

Readers at all levels seemed to attend more to syntactic structure than to meaning. (This may in part be attributable to the taxonomy used, which has determined that an error cannot be marked higher on semantic acceptability than it is marked on grammatical [syntactic] acceptability.) Only a small number of errors were recorded that were totally unacceptable (1968). There was also a strong tendency to retain the grammatical function of the stimulus word (1968, 1973) even if the grammatical structure was changed (1969). Because there was a decrease with age in the number of errors which changed the syntax, it was concluded that there was an increased ability to handle the author's structure with age (1969).

In the 1973 taxonomy, a new rating was devised to assess the reader's concern for meaning -- the 'comprehending rating'. It was comprised of the proportion of errors, either before or after correction, which resulted in the production of a totally acceptable structure in terms of meaning. There was a slight increase with age on this measure (grade two average subjects scored 53.1 percent, while grade ten high subjects scored 81.4 percent). It should be noted that this rating assumes that readers do not make corrections silently or "in their heads" and is inaccurate, therefore, in proportion to the number of errors that the reader does correct silently.

Approximately 70 percent of all errors committed remained uncorrected. Errors which were semantically and/or syntactically acceptable with what came prior in the sentence tended to cue the reader most frequently to make a correction. However, corrections

based on semantic cues remained 15 to 20 percent below those based on syntactic cues. Graphic and phonemic proximity also cued corrections, as a percentage of errors which produced semantically and syntactically acceptable structures were corrected. However, approximately 25 percent of errors which were totally unacceptable in terms of grammatical structure or meaning were not corrected. This indicates either that meaning was hard to recover or that the reader was able to correct silently.

In terms of comprehension, there did not appear to be an increase in ability to comprehend (as measured by the retelling score) with an increase in age (1969, 1973). It should be noted that all groups in the 1973 study were not given the same passage to read, but rather, were asked to read passages of difficulty relative to their level of reading achievement.

In summary, these studies concerning the oral reading behaviour of proficient readers have supported the view of reading as a language processing activity. Proficient readers appear to use information from all three cue systems in varying degrees.

Studies Comparing the Oral Reading Behaviour of Good and Poor Readers

Previously mentioned studies on beginning reading cited some differences between good and poor readers. This section will review several studies designed specifically to compare good and poor readers, in addition to reporting on selected studies which have described oral reading errors of poor readers only.

Much early research focussed on reversal-type errors and Orton's theory of lack of cortical dominance as being responsible for

this phenomenon. Research findings (Davidson, 1934; Hill, 1936; and Malmquist, 1958) indicated that both good and poor readers made several types of errors, including reversals, and that reversal errors tended to decrease with an increase in chronological or mental age (Davidson ,1934; and Malmquist, 1958).

Other research was based, however, on a recognition that graphic cues were not all readers used in reading. Two early studies by Swanson (1937) and Fairbanks (1937) investigated the oral reading errors of good and poor readers. Both studies involved samples of college freshmen, who were classified on proficiency according to their performance on a silent reading test.

Swanson (1937) classified the 'oral inaccuracies' of good and poor subjects reading passages aloud and the results indicated that while good readers made approximately the same mean number of all types of errors (sample, substitutions, omissions, etc.), the poor readers made significantly more of some types of errors than of others. The errors of the good readers did not tend to alter the meaning of the selection while the errors of the poor readers tended to change the meaning significantly. It was noted that poor readers made errors on easy as well as difficult words, which was not the case for the good readers. A difference in correctional behaviour was recorded, with the good readers correcting almost twice as many errors as the poor readers. It is also interesting to note that the poor readers' performance decreased when they were asked to focus on oral production rather than on the meaning. The behaviour of the good readers was not affected by the purpose set for the task.

Fairbanks (1937) studied eye movements in addition to the oral

reading errors and his findings supported those of Swanson. Substitutions were the most frequent error and, while none of the good readers' substitutions seriously affected the meaning, over one-half of those made by the poor readers did affect the passage meaning. Poor readers were found to more frequently repeat correctly than erroneously read words, while the reverse was true for the good readers. The poorer readers made three times as many errors as the good readers, but corrected almost one-third less errors; the good readers corrected 19 percent of all errors and the poor readers corrected seven percent of all errors. Fairbanks concluded the good readers appeared to notice more of their errors than did the poor readers. In spite of hesitating and regressing, poor readers made errors and had a tendency to make ineffectual regressions after the errors were made.

Bennett (1942) also recognized that graphic cues were not the only cues readers used in reading. She analysed approximately 34,000 errors committed by poor third to fifth-grade readers in 30 tutorial sessions. The errors were made while reading short paragraphs and were later classified and compared to the expected response. Errors with the same beginning and ending as the expected response accounted for 33 percent of the errors. Reversals of words and letters were frequent (12 percent of the errors) but were found to be less prevalent as the sessions progressed. Bennett found that, though beginning and ending letters were frequently used cues in word recognition, context was found to be salient as well and was incorporated in governing the verbal response. Forty-one percent of the errors were closely associated in thought with the response and a negligible number of

these differed in part of speech. In addition, 50 percent of those not associated with the expected response were the same part of speech. Bennett concluded that word recognition and pronunciation were partly controlled by the neural centers involved in language usage and that errors were governed by the context in which the stimuli were incorporated.

More recently, Shandling (1970) examined the oral reading behaviour of ten reading disabled boys between the ages of eight and ten years. Four reading samples were analysed between November and March according to the Goodman Taxonomy of Oral Reading Miscues (K. Goodman, 1969). The subjects were most efficient at processing syntactic information, while their use of grapho-phonic and semantic information was weak. Over the period of the study, the subjects' ability to integrate graphic and phonic information improved, while their ability to integrate information from all three cue systems decreased.

While Shandling restricted her study to an analysis of oral reading errors of poor readers, several other recent studies have compared the oral reading behaviour of good and poor readers.

Jensen (1972) analysed the oral reading behaviour of 15 subjects, five proficient second graders, five weak sixth graders, and five proficient sixth graders. All subjects read a third-grade passage orally. The oral reading errors were analysed according to the Goodman Taxonomy. Several differences between the weak and the proficient readers were indicated. The proficient readers' errors were less graphically similar to the text than those of the weak readers. Secondly, the proficient readers produced a higher

percentage of syntactically acceptable sentences than did the weak readers. In terms of meaning, the substitutions at the word level made by the proficient readers showed more relation to the text than did those of the weak readers, and the proficient readers had higher success in retaining passage meaning than did the weak readers. It is difficult to evaluate Jensen's conclusions, however, since it is not clear that the third-grade passage afforded the same degree of difficulty to the proficient grade two subjects and the weak grade six subjects; the level of reading achievement for the two groups was not stated. In addition, no attempt was made to control any other variables such as intellectual ability, and because of the small sample size, statistical treatment of the data was not possible.

A study which did attempt to control for level of intellectual ability and of reading achievement was conducted by Brody (1973). She examined the oral reading errors of six readers. Three of the subjects were proficient third graders and the poorer readers were two fifth graders and one sixth grader. The group means differed on intelligence test scores by two points and on reading achievement by three-tenths of a year. Brody noted the following differences between the two groups on the errors made reading a sixth-grade passage, although statistical treatment of the data was not possible (due to small sample size). In terms of errors per hundred words, the poor readers made considerably more errors than did the proficient readers (8.0 versus 5.7). The proficient group showed more use of graphic and phonic information than did the poor group, and, while the poor group had similar percentages on both variables (graphic and phonic), the proficient group showed greater use of graphic information

than phonic information. Little difference was indicated in the use of syntactic cues by the two groups, and approximately 70 percent of the substitutions made by both groups were of the same grammatical function as the expected response. Both groups had the same number of errors resulting in meaning loss, though the proficient group scored slightly higher on the retelling of the story.

When Brody compared the performances of the groups over different segments of the text, however, other differences were apparent. The miscues per hundred words increased for both groups over each successive segment of the text, but more markedly for the poor group. The poor group made a consistent number of corrections on miscues that were semantically and syntactically acceptable, while these corrections steadily decreased for the proficient readers. The proficient group also demonstrated a high level of consistency on comprehension scores throughout the test. Although the mean test score on meaning loss was similar for both groups, the poor group's scores showed a marked and steady increase on successive segments of the test. Both groups exhibited a gradual decline in the percentage of errors which demonstrated full and partial grammatical acceptability, though the range of performance was again greater for the poorer readers. In summary, there was no decrease for the poor readers in the use of graphic or of phonic cues, or in the retention of the grammatical function of the expected response as the test progressed. There was, however, a steady decline in the grammatical acceptability of responses and an increase in meaning loss. Brody concluded that the poorer readers tended to rely more heavily on less complex cues (i.e. graphic, phonic, and grammatical function) as they became

fatigued or frustrated and were less able to use more sophisticated cues (i.e. syntactic or semantic acceptability).

Other information on the differences between good and poor readers' oral reading behaviour was afforded in the study reported by K. Goodman and Burke (1973). Because readers at varying levels of proficiency were included in the study, five separate comparisons could be made of the oral reading behaviour of proficient, average, and low readers. The five comparisons involved (1) high-average grade two readers and low grade six readers, (2) high grade two readers and average grade four readers, (3) high grade four, average grade six, and low grade eight readers, (4) high grade six, average grade eight, and low grade ten readers, and (5) high grade eight, low grade ten, low-average grade ten, high-average grade ten, and high grade ten readers. Each group of readers was comprised of five or six subjects. All groups within a comparison read the same passage and it was intended that the passage would be of the same difficulty for each group being compared. The proficient grade four, average grade six, and low grade eight readers, for example, read a sixth grade passage. In addition, the last comparison group (see (5) above) read two passages, one considerably more difficult than the other.

The results from all five comparisons indicated similarities in the performances of proficiency groups at different grade levels. In all comparisons, the proficient readers made the fewest errors per hundred words. They were followed closely by the average readers, while the low readers made significantly more errors (for example, the high four, average six, and low eighth graders scored 3.6, 4.2, and 11.3 miscues per hundred words, respectively). The high

proficiency groups consistently had higher 'comprehending ratings', a higher percentage of semantically and syntactically acceptable errors, and a higher rate of corrections, especially for semantically and syntactically unacceptable errors. This suggests that poor readers were not as able to use syntactic information and to retain passage meaning as were more proficient readers. The amount of graphic and phonic information utilized appeared to be a function of grade level as well as of proficiency. At the grade two level, the proficient group used more grapho-phonic information than did the average or low groups, but from the fourth-grade level on, there was little difference between proficiency groups on the use of grapho-phonic information. The above results were consistent with the results of all but one comparison -- that of the high eight, low-average ten, high-average ten, and high ten readers. On the easier passage, there were no differences between any of the proficiency groups in any category except percentage of corrections. There, the average tenth-grade readers corrected more errors (30 to 33 percent corrected), than either the high grade eight readers (21 percent corrected), or the high tenth-grade readers(18 percent corrected). These findings cited previously were obtained on the more difficult passage. It would then appear then, that the difficulty of a passage in relation to the reader's level of reading achievement may affect the way in which he processes print. Unfortunately, Goodman and Burke did not report the level of reading achievement of the different proficiency groups. Therefore, it is impossible to determine if differences in the strategies used by different proficiency groups were due to the difficulty of the material, in relation to their level of

reading achievement, or to other factors.

Research by Leslie, Lauren and Patasol (1977) has suggested that reading levels do affect the strategies used by readers. They found that when eighth graders read with 95 percent oral reading accuracy, fewer errors were made which resulted in meaning loss (i.e. were not semantically acceptable). Significantly more errors of this type were made when the subjects' oral reading accuracy was between 90 and 94 percent.

While previous studies discussed in this section had insufficient sample sizes to permit the use of statistical treatment of the data, one study comparing the oral reading errors of good and poor readers has used statistical analyses. Pacl (1977) investigated the differences in oral reading behaviour among proficient, average, and low readers. A scoring method devised by Hood (1976) was used to analyse the data and this procedure differs from the Goodman Taxonomy in several ways. While the Goodman Taxonomy had a nine point scale for evaluating the graphic proximity of the observed to the expected response, Hood's procedure allowed for an error to be judged as similar if the error began with the same letter as the expected response. Whereas the Goodman Taxonomy attempted to separate the effects of semantic and syntactic constraints, Hood's procedure combined these two aspects to form a context rating. An error was then judged as being (1) not appropriate, (2) appropriate with the preceding context, (3) appropriate with the sentence context, or (4) appropriate with the passage context. Hood assumed that uncorrected errors that were not appropriate, or were appropriate with either preceding or sentence context, were all indications of meaning loss

and the total of these errors comprised the Meaning Loss rating.

Pacl's three groups consisted of ten reading 'disabled' seventh graders, ten average fourth graders, and ten average seventh graders. The mean scores for each group on the Iowa Test of Basic Skills were 5.3 (disabled seventh graders), 3.6 (average fourth graders), and 7.3 (average seventh graders). Both the disabled readers and the fourth-grade readers scored at the fourth-grade level on a word recognition test, while the average seventh-grade readers scored at the grade seven level. The disabled seventh and the average fourth-grade readers read a passage at the grade four level and the seventh graders read a passage at the grade seven level. The results of the statistical analysis of the data indicated that the disabled readers made more errors resulting in meaning loss than did both groups of average readers. Pacl also noted that the disabled readers miscued on high frequency words whereas the average readers miscued on low frequency words.

A final study (Guthrie, 1973) will be discussed in this section, though it does not deal with oral reading in context. It will be included, however, because it has addressed the problem of integration of information, which has been cited by other researchers (Weber, Biemiller, Shandling, Brody) as being an area of difficulty for poor readers.

Guthrie examined the development of phoneme-grapheme association skills in normal and disabled readers. The 48 subjects were divided into three groups: 19 defined as 'disabled' readers (aged nine); 19 subjects defined as 'young normal' readers (aged seven) who were matched with the disabled readers on reading level

and level of intellectual ability; and ten subjects defined as 'old normal' readers, who were matched with 'disabled' readers on chronological age and level of intellectual ability, but not on level of reading achievement. The subjects were tested on a criterion-referenced test of reading subskills (The Kennedy Institute Phonics Test). The results indicated that the 'old normal' readers had mastered all of the phonic skills. The 'old normal' readers differed significantly from the 'young normal' readers and the 'disabled' readers; there was no significant difference between the latter two groups (the 'young normal' readers and the 'disabled' readers) on knowledge of the reading subskills. While subskills were highly intercorrelated for both the 'old' and the 'young normal' readers, intercorrelations were largely insignificant for the 'disabled' readers. Although there was no difference between the 'young normal' readers and the 'disabled' readers on the level of subskill knowledge, there was a difference in the integration of subskills. Guthrie hypothesized that this lack of interfacilitation of reading subskills was a debilitating factor for the disabled readers.

These studies comparing the oral reading behaviour of good and poor readers have supported the view of reading as a language-processing activity and have shown that poor readers as well as good readers make use of the contextual constraints as well as graphic constraints. Differences cited between good and poor readers were in the number of miscues per hundred words, the percentage of errors corrected, the percentage of errors resulting in semantically acceptable errors, the ability to retain the meaning of the passage, and the ability to integrate information from two or more cue systems.

SUMMARY

Reading is viewed by many theorists as a language-processing activity in which the reader interacts with information from the page. The reader brings to the reading act his knowledge of past experience and his knowledge of language. Research into oral reading behaviour has been found to be one way of analysing the way readers interact with print.

The findings from oral reading research indicate that as soon as children begin reading, they attempt to use information from all three cue systems -- grapho-phonic, syntactic, and semantic. As they progress toward proficiency, readers become better able to use and integrate information, relying more heavily on semantic and syntactic cues at later stages.

The studies cited, while not matched in design, instrument used for evaluation, or age of the subjects, have indicated some commonalities in the results concerning differences between good and poor readers. Most reported that good readers had more success in retaining the meaning of the passage, made fewer errors per hundred words, and corrected a higher percentage of their errors than did poor readers. Some disagreement was noted with regard to use of graphic information. There appeared to be little difference in the amount of syntactic information used by good and poor readers. However, good readers were found to be able to use more semantic information than poor readers when they were compared on a rating which determined the proportion of errors, either before or after correction, which were semantically acceptable. Integration of information from the cue

systems was cited as a difficulty for poor readers, as was a lack of interfacilitation of reading subskills.

Chapter 3

THE EXPERIMENTAL DESIGN

This chapter will describe the selection of the sample, the selection of the testing instruments, the administration and scoring of the tests, and the coding and analysis of the data.

The purpose of the study was to compare the oral reading behaviour of average grade four readers and poor grade six readers having a comparable level of reading achievement.

THE SELECTION OF THE SAMPLE

The test sample was drawn from three elementary schools assigned to the investigator by officials of the Edmonton Separate School Board, who indicated that these schools served a population of predominantly lower-middle class families.

The initial test population consisted of 61 fourth-grade students from three classrooms in the three schools and 100 sixth-grade students from four classrooms in two of the schools. The New Developmental Reading Test, Form A(1968), was administered to the test population.

To obtain subjects for the grade six group, the results on General Comprehension of the New Developmental Reading Test were surveyed. The grade scores for the grade six group ranged from 3.1 to 10.2 and the mean grade score for the fourth-grade test population on General Comprehension was 4.9. Therefore, it would have been desirable to select grade six students having a General Comprehension grade

equivalent ranging from 4.5 to 5.5. As there were not enough students in the range from 4.5 to 5.5, the range of scores was increased to 4.0 to 5.5, and 23 grade six students were selected, having a General Comprehension score in this range. Because it was intended that children at the extreme ends of the scale on intellectual ability were eliminated, it was decided that students who had scores on intelligence tests of below 80 or above 110 recorded on their cumulative record card would be excluded from the research sample. Those children who did not have scores from an intelligence test on their cumulative record cards were also excluded. In addition, those students with known hearing or vision problems, or who had been judged by the classroom teacher or the investigator as not being fluent English-speakers, were also eliminated from the sample. Fifteen students met the above criteria and formed the grade six group.

Table 1 indicates the General Comprehension score on the New Developmental Reading Test, Form A(1968), the score on an intelligence test, the sex, and the chronological age for each subject in the sixth-grade sample. There were eight male and seven female subjects in this group and the mean chronological age for the group was twelve years one month.

All those fourth-grade students who had a General Comprehension score on the New Developmental Reading Test, Form A(1968), of between 4.0 and 5.5, and who had a score on an intelligence test of between 80 and 110 recorded in their cumulative record cards were selected. Again, those students who had known hearing or vision problems, or who were judged by their classroom teacher or the investigator to be deficient in language skills, were eliminated. A group of 19 students

met the above criteria, and from this group, 15 subjects were randomly selected to form the grade four group.

Table 2 indicates the General Comprehension score, the score from an intelligence test, the sex, and the chronological age of each subject in the fourth-grade group. There were eight males and seven females in this group, and the mean chronological age was nine years nine months.

t-tests were computed on the variables of General Comprehension score and score on an intelligence test to determine whether or not the samples came from the same population. The results indicated that on the General Comprehension variable the two groups did not differ significantly, and therefore did not represent two different populations ($t = -1.287$, $p = 0.209$). The mean for the grade four group was 4.76, with a standard deviation of 0.372. The mean for the grade six group on this variable was 4.97, with a standard deviation of 0.523, indicating there was somewhat more variance in the grade six group. On the second variable, score on an intelligence test, the mean for the grade four group was 92.8, with a standard deviation of 6.900. The mean for the sixth graders was 91.6, with a standard deviation of 7.170, again indicating somewhat greater variance in the sixth-grade group. The groups did not differ significantly on the second variable, intelligence test score, and hence did not represent two different populations ($t = 0.467$, $p = 0.644$). Therefore, while the two groups differed on chronological age, they did not differ significantly on the variables of General Comprehension and intelligence test score.

Table 1

Background Information on Sixth-grade Subjects

Subject	Sex	General Comprehension Score	I.Q.	C.A. (May 1977)
16	M	4.1	101	11 yr. 07 mo.
17	M	5.0	88 *	12 yr. 0 mo.
18	M	4.6	109	11 yr. 10 mo.
19	M	5.6	93	13 yr. 08 mo.
20	F	4.9	88	12 yr. 02 mo.
21	M	5.6	90	11 yr. 11 mo.
22	F	4.9	97	11 yr. 09 mo.
23	F	4.6	91 *	11 yr. 11 mo.
24	M	5.5	98	13 yr. 09 mo.
25	M	5.5	93	11 yr. 07 mo.
26	F	4.1	86	11 yr. 09 mo.
27	F	4.7	88	11 yr. 07 mo.
28	M	4.6	82	11 yr. 10 mo.
29	F	5.5	86	12 yr. 05 mo.
30	F	5.4	84	12 yr. 0 mo.

* Scores on the Weschler Intelligence Scale for Children.

Table 2

Background Information on Fourth-grade Subjects

Subject	Sex	General Comprehension Score	I.Q.	C.A. (May 1977)
01	M	4.3	89	9 yr. 08 mo.
02	F	5.2	101*	10 yr. 0 mo.
03	M	f.8	85	9 yr. 04 mo.
04	M	5.1	87	9 yr. 10 mo.
05	F	4.2	82	10 yr. 02 mo.
06	F	4.6	104	9 yr. 10 mo.
07	F	5.3	88	9 yr. 10 mo.
08	M	4.7	99	10 yr. 01 mo.
09	F	4.6	99	9 yr. 09 mo.
10	F	4.6	91	9 yr. 05 mo.
11	M	5.4	103	9 yr. 03 mo.
12	M	4.6	92	9 yr. 02 mo.
13	F	4.8	86	10 yr. 02 mo.
14	M	4.8	91	10 yr. 01 mo.
15	M	4.1	95	9 yr. 08 mo.

* SRA Primary Test of Mental Abilities Score.

TESTING INSTRUMENTS

Results from six tests were used in this study: the New Developmental Reading Test (Bond, Balow and Hoyt, 1968), the Canadian Lorge-Thorndike Intelligence Test (1967), the SRA Primary Test of Mental Abilities (1962), the Weschler Intelligence Scale for Children, and the Reading Miscue Inventory (Goodman, Burke, 1972).

The New Developmental Reading Test, Form A, was used to obtain a measure of each student's reading achievement. This test has five subtests yielding a vocabulary score, a Literal Comprehension score, a Creative Comprehension score, and a General Comprehension score. The test has two forms. It was normed on 15,000 pupils in the United States and norms are available for each subtest as well as for the four scores. The alternate-form reliability of the subtests ranges from 0.79 to 0.89, while the internal consistency reliability ranges from 0.83 to 0.94. The grade equivalents on the General Comprehension score were used to select subjects for inclusion in the sample for the study. These scores were used because reading is viewed by the investigator as a communication process. Therefore, a comprehension score would be the most apt measure of a student's level of reading achievement. In addition, the General Comprehension score is an average of the scores on the two literal and the two creative subtests of the New Developmental Reading Test.

Results from the Canadian Lorge-Thorndike Intelligence Test (1967), Multi-level Edition Grades 3-9, were used to indicate a measure of intelligence in order to screen subjects for the sample. Level B had been administered to most of the children in the test when they were in the fourth grade, by Edmonton Separate School

Board personnel. This test includes both a verbal battery consisting of only verbal items, and a nonverbal battery containing only pictorial or numerical items. The test was normed on a stratified random sample of 4,000 to 5,000 students per grade. The odd-even reliability of the verbal battery ranged from 0.945 to 0.867 through levels A-F while the nonverbal battery reliability ranged from 0.931 to 0.894. The correlation of the verbal to the nonverbal battery yielded coefficients of 0.681 to 0.558, indicating that an average of the verbal and nonverbal batteries provides a reliable overall measure of intelligence. With respect to validity, correlation of the verbal battery with results on the Weschler Intelligence Scale for Children was 0.75 and Otis Quick Scoring Mental Ability Test was 0.82. Canadian Lorge-Thorndike Intelligence Test scores were not available for three subjects. Consequently, scores from the Weschler Intelligence Scale for Children and the SRA Primary Test of Mental Abilities (1962) were used. Intercorrelations for the SRA Primary Test of Mental Abilities and the Canadian Lorge-Thorndike Intelligence Test were not available, but the SRA Primary Test of Mental Abilities was found to correlate 0.78 with the Otis Quick Scoring Mental Ability Test.

The third measure used in the study was the Reading Miscue Inventory. Two passages were selected from the inventory for the oral reading test, the fourth-grade, "Space Pet", and the fifth-grade, "Zoo Doctor", passages. The Dale-Chall Readability Formula (1948) was applied to three samples from each selection. The results indicated that the readability level for "Space Pet" was fourth grade or below. The readability level for "Zoo Doctor" was at a fifth to

sixth-grade level.

ADMINISTRATION OF THE INSTRUMENTS

The New Developmental Reading Test, Form A, was administered between April 29, 1977 and May 10, 1977. All tests were administered by the investigator to each of the seven classes. Class sizes ranged from 18 to 27 students. The test consisted of five ten-minute timed subtests and was administered according to manual instructions, with two rest periods.

The intelligence test scores from the Canadian Lorge-Thorndike Intelligence Test, the Weschler Intelligence Scale for Children, and the Primary Test of Mental Abilities were procured from the cumulative record cards of each of the subjects.

The passages from the Reading Miscue Inventory were administered during the week of May 16, 1977. These testing sessions were conducted individually with each subject by the investigator, or one of two assistants. Both assistants were graduate students in Reading, having expertise in the administration of oral reading tests.

All testers used Sony cassette tape recorders to tape the testing sessions. The purpose of the test was explained to the subject and he was then asked to read two passages and to retell all that he could of each selection upon its completion. The oral recall was included in the test format to ensure that each subject perceived the task as requiring him to read for meaning. (Complete directions for administration of the test are included in Appendix A.) Each subject then read each of the two passages and was asked to tell all

that he could remember. Each tester recorded oral reading miscues and story recalls.

SCORING OF THE INSTRUMENTS

The New Developmental Reading Test was marked by the investigator according to the scoring keys provided by the publisher. Standard scores were obtained for each of the five subtests and for Vocabulary, Literal Comprehension, Creative Comprehension, and General Comprehension. The General Comprehension scores were transformed into grade equivalent scores from the norms provided in the Teacher's Manual.

All oral reading errors from the Reading Miscue Inventory were transcribed from the tapes to copies of the passages. Listed below are the types of errors that were recorded.

1. Substitution. A real word was given instead of the expected response.

   Example: "I waited for the news to fall", for "I waited for the news to follow".

2. Mispronunciation. A nonreal word response was given instead of the expected response.

   Example: "Beaming *brodely Sven removed the mask . . .," for, "Beaming broadly Sven removed the mask . . .".

3. Omission. An expected response was omitted.

   Example: "I looked and my first view of Claribel", for, "I looked and had my first view of

Claribel".

4. Insertion. A word was inserted into the test.

Example. "I heard a whistle and I thought it was you", for, "I heard a whistle and thought it was you".

In addition, correctional behaviour was noted; each error was marked as either being successfully corrected or not.

CODING OF THE DATA

Establishing Categories

In order to determine the strategies being used by the reader in processing print, it was necessary to establish categories into which the miscues could be coded. K. Goodman (1972) devised a taxonomy to evaluate oral reading miscues and the categories constructed by the investigator were based on his previous work.

In order to determine whether or not individual subjects were reading at instructional or frustration level, and to compare group performances, a category indicating miscues per hundred words was devised.

1.0 Miscues Per Hundred Words. The number of words read by the subject to generate 50 miscues was calculated. The number of miscues per hundred words was then calculated by the following formula: $\frac{\text{50 miscues}}{\text{number of words read}} = \frac{\text{x miscues}}{\text{100 words}}$.

To evaluate the amount of information used from the cue systems in each miscue, the observed response was compared to the expected response for graphic similarity and was judged on grammatic

and semantic acceptability. Definitions, examples, and procedures are listed below for each of these categories.

2.1 Graphic Similarity. The observed response was compared with the expected response in terms of graphic display.

The expected response was divided into three parts and the observed responsed was compared with it. If two or more parts were exactly alike, the miscue was coded as having 'high' graphic similarity to the expected response. If less than two parts were the same, a coding of 'zero' was assigned.

Guidelines for the division of the expected response were as follows. In one-syllable words, vowel or consonant clusters were kept together (e.g. h/a/nd). With two-syllable words, the first syllable was the first unit, the last letter, or letter cluster, was the last unit, and the remainder was the middle unit (e.g. hold/i/ng). In three-syllable words, each syllable was a part or unit (e.g. qui/et/ness). In four or five-syllable words, the first syllable was the first unit, the last syllable was the last unit, and the remainder was the medial part (e.g. con/vocat/ing, and pre/occupa/tion).

2.2 Syntactic Acceptability. The observed response was judged within the grammatical structure produced. If the miscue resulted in a grammatical sentence, it was marked 'high', otherwise, it was marked 'zero'. For example, "She went to the store", for, "John went to the store", would be marked 'high'.

2.3 Semantic Acceptability. The observed response was judged in terms of the passage meaning. The error could change the

meaning of the passage, but had to be consistent with it. Because meaning cannot exist without syntactic order, semantic acceptability could never be marked higher than grammatic acceptability. For example, "He came back and explained what had happened", for "He came back to explain what had happened" would be marked 'high'.

In order to determine the degree to which the reader integrated information from two or more cue systems, the following categories were devised.

3.1 Graphic Similarity and Syntactic Acceptability. The observed responses, which had a rating of 'high' on the categories of both graphic similarity and syntactic acceptability, were classified in this category.

3.2 Graphic Similarity and Semantic Acceptability. The observed responses, which had a rating of 'high' on the categories of both graphic similarity and semantic acceptability, were classified in this category.

3.3 Syntactic and Semantic Acceptability. Those observed responses which had been assigned a rating of 'high' on the categories of both syntactic and semantic acceptability, were classified in this category.

3.4 Graphic Similarity, Syntactic and Semantic Acceptability. Those observed responses which had a rating of 'high' on the categories of graphic similarity, syntactic acceptability, and semantic acceptability, were classified in this category.

In order to determine information used by the reader in

correcting errors, three categories were devised.

4.1 Graphically Dissimilar Errors Corrected. Those observed responses coded as 'zero' on Graphic Similarity that were corrected by the reader, were classified in this category.

4.2 Syntactically Unacceptable Errors Corrected. Those observed responses coded as 'zero' on Syntactic Acceptability that were corrected by the reader, were classified in this category.

4.3 Semantically Unacceptable Errors Corrected. Those observed responses coded as 'zero' on Semantic Acceptability that were corrected by the reader, were classified in this category.

Coding of the Data into Categories

Goodman (1973) has suggested that fifty or more miscues must be analysed for a reader to give a valid indication of strategies in a research study. Consequently, the first 50 errors made by each subject were recorded. The observed responses were then coded into the eleven categories previously mentioned (see pp. 45-48). Upon completion of the coding, a raw score was available for each of the first eight categories for each subject in the two groups. For the last three categories (Graphically Dissimilar Errors Corrected, Syntactically Unacceptable Errors Corrected, and Semantically Unacceptable Errors Corrected) proportion scores were computed for each category for each subject. The proportion was computed as the number of errors of each type corrected, divided by the total number of that type of error made, for example,

$$\frac{\text{number of graphically dissimilar errors corrected}}{\text{total number of graphically dissimilar errors}}.$$

Interscorer Reliability of the Coding

Three subjects were randomly selected for an interscorer reliability check. An independent judge rated the 50 miscues of each of the three subjects into the eleven categories outlined above. Reliability between the investigator and the independent scorer was calculated to determine the rate of agreement. The Arrington Reliability Formula (Feifel and Lorge, 1950) was used to compute the reliability score $\left(\frac{2 \times \text{Total of Agreements}}{(2 \times \text{Total of Agreements}) + \text{Disagreements}}\right)$. The formula yielded a score of 0.95, an acceptable rate of agreement.

ANALYSIS OF THE DATA

The computing facilities in the Division of Educational Research Services at the University of Alberta were used to analyse the data.

In order to determine whether the two groups differed significantly on any of the eleven categories, t-tests were used. The t-tests were used to test the differences in means for independent samples. An assumption in the use of the t-test is that there is homogeneity in the variance of the two samples being compared. In order to verify this assumption, F-tests were used on each of the eleven variables, or categories. Results of the F-tests on two of the categories, 3.2 (Graphic Similarity and Semantic Acceptability) and 3.4 (Graphic Similarity, Grammatic and Semantic Acceptability) indicated that there was an unacceptable amount of variance between the two groups. Therefore, Welch t-tests which correct for unequal variance, were employed to assess differences in means on those

those variables that did not have homogeneity of variance.

Pearson product moment correlation coefficients were used to provide additional statistical information on the relationships between variables for each group.

SUMMARY

A sample of fifteen grade four students and fifteen grade six students was selected from three schools in the Edmonton Separate School Board. The initial test sample was comprised of 61 fourth-grade students and 100 sixth-grade students. The New Developmental Reading Test, Form A, was administered to all of the students. Fifteen grade six students and fifteen grade four students, having a General Comprehension score of between 4.0 and 5.5, were selected for the sample. The Canadian Lorge-Thorndike Intelligence Test scores were used to screen subjects for the sample, so that students scoring below 80 or above 110 were excluded.

Two reading passages from the Reading Miscue Inventory were administered individually to each of the fifteen subjects in each group, and the oral reading productions were transcribed from the tapes onto scoring sheets.

Each miscue was analysed according to ten categories and the number of errors per hundred words was calculated.

The statistical treatment of the data included t-tests, F-tests, Welch t-tests, and Pearson product moment correlation coefficients.

Chapter 4

ANALYSIS AND DISCUSSION OF THE DATA

The main purpose of this study was to investigate the differences in oral reading behaviour between good and poor readers. This chapter will present the results of the analyses in relation to quantitative and qualitative differences in good and poor readers' oral reading errors. In addition, a discussion of the results will be presented and an attempt will be made to draw conclusions about differences in the way good and poor readers process print.

To facilitate the discussion of the data, the oral reading behaviour of the two groups of readers will be considered in relation to the following general topics: oral reading accuracy of individuals and groups, the amount of information used from specific cue systems, the degree of integration from two or more cue systems, correctional behaviour, and interrelationships among variables.

ORAL READING ACCURACY OF INDIVIDUALS AND ACHIEVEMENT GROUPS

The category of Miscues Per Hundred Words was constructed for two purposes: (1) to determine if individuals within the groups were reading at instructional level, and (2) to compare the number of errors made by the good and poor readers.

Oral Reading Accuracy of Individuals

The total sample of 30 readers ranged from 4.0 to 5.5 on the general comprehension rating of a standardized reading achievement

test, and hence, passages on the test instrument of this study were selected at a fourth to sixth-grade reading level. Oral reading accuracy, as determined by Miscues Per Hundred Words, was used to confirm the appropriateness of the passages chosen for the individual readers in both the good and poor groups of readers.

Table 3 depicts the individual scores for both groups of readers on the variable Miscues Per Hundred Words.

It can be noted from Table 3 that the lowest number of Miscues Per Hundred Words was achieved by Subject 25 (2.68), followed closely by Subject 23 (2.90). Both of these students were in the group of poor readers. The two subjects with the highest number of Miscues Per Hundred Words were Subject 28 (23.40) and Subject 10 (19.53). Subject 28 was in the group of poor readers, while Subject 10 was in the group of good readers.

Research findings (Goodman, 1967) have suggested that readers with oral reading accuracy scores within the range of four to 14 Miscues Per Hundred Words are able to score adequately on a comprehension rating. An informal appraisal of the subjects' retelling of the passages read confirmed that those subjects with 15 or more errors per hundred words, did not have satisfactory comprehension (Subjects 10, 19, 26, and 28).

In contrast to Y. Goodman's findings, however, those subjects scoring less than four miscues per hundred words (Subjects 14, 23, and 25) did appear to have adequate comprehension. Therefore, it would appear that while Subjects 10, 19, 26, and 28 were reading material that was difficult for them, the rest of the sample was reading material at an appropriate level.

Table 3

Miscues Per Hundred Words (M.P.H.W.) for Individuals in the Good and Poor Reading Groups

Good Readers		Poor Readers	
Subject	M.P.H.W.	Subject	M.P.H.W.
01	10.82	16	11.14
02	6.98	17	13.85
03	9.40	18	5.18
04	5.77	19	16.55
05	11.26	20	8.24
06	8.34	21	6.25
07	7.16	22	7.49
08	7.18	23	2.90
09	6.15	24	6.79
10	19.53	25	2.68
11	7.18	26	16.23
12	10.99	27	5.77
13	14.84	28	23.40
14	3.99	29	6.86
15	13.44	30	9.98

A Comparison of the Number of Errors Made by Good and Poor Readers

In order to determine if there was a difference between good and poor readers in the number of errors made per hundred words, Hypothesis 1.10 was formulated.

Hypothesis 1.10

The good readers will make significantly fewer miscues per hundred words than will the poor readers.

Hypothesis 1.10 was tested using t-tests to compare the two groups of readers (independent samples) on the mean number of miscues per hundred words. The means and standard deviations for each group are presented in Table 4.

Table 4

Mean Scores and Standard Deviations for Miscues Per Hundred Words (N = 30)

Group	Mean Score	Standard Deviations
Good Readers	9.54	4.06
Poor Readers	9.56	5.76

The t-test results indicate that there was no significant difference in the mean scores on Miscues Per Hundred Words of good and poor readers ($t = -0.0124$, $df = 28$, $p = .4951$, n.s.). Therefore, on the basis of the statistical analysis carried out on the data, Hypothesis 1.10 could not be accepted.

INFORMATION USED FROM SPECIFIC CUE SYSTEMS

In order to determine if there was a significant difference between good and poor readers in relation to the amount of information used from specific cue systems (graphic, syntactic, and semantic), Hypothesis 2.10 was formulated.

Hypothesis 2.10

The good readers will make significantly more of each of the following types of errors than will the poor readers:

2.11 errors with high graphic similarity to the expected response,

2.12 errors which produce a syntactically acceptable sentence,

2.13 errors which are semantically acceptable in relation to passage meaning.

As in the case of Hypothesis 1.10, t-tests for independent samples were used to test Hypothesis 2.10.

The mean scores, standard deviations, and t-values for both proficiency groups are depicted in Table 5. These scores are based on the first 50 miscues made by each subject.

In relation to information used from specific cue systems (i.e. graphic, syntactic, and semantic) as judged by the categories of Graphic Similarity, Syntactic Acceptability, and Semantic Acceptability, no significant differences were noted between good and poor readers. Hence, on the basis of the statistical analysis carried out on the data, Hypothesis 2.10 could not be accepted. It appears from these results that both groups relied on information from all three cue systems, and that they did not differ significantly on the extent to which they relied on each of the cue systems.

Table 5

Mean Scores, Standard Deviations, and t-Values for the Variables of Graphic Similarity, Syntactic Acceptability, and Semantic Acceptability (N = 30, df = 28)

Categories of errors	Good Readers Mean	Good Readers S.D.	Poor Readers Mean	Poor Readers S.D.	t-value	P (one-tail)
Graphic Similarity	19.20	4.65	20.00	5.84	0.4356	.3333
Syntactic Acceptability	33.00	3.48	31.20	3.19	1.4758	.0758
Semantic Acceptability	11.60	4.53	12.67	4.89	-0.6193	.2704

INTEGRATION OF INFORMATION FROM TWO OR MORE SYSTEMS

In order to determine if there was a difference between good and poor readers in the degree of integration of information from two or more cue systems, Hypothesis 3.10 was formulated.

Hypothesis 3.10

The good readers will be able to integrate information from the cue systems to a significantly greater degree than the poor readers in terms of

3.11 the number of errors which have high graphic similarity and are semantically acceptable (GRAP SIM + SEM ACC),

3.12 the number of errors which have high graphic similarity and are syntactically acceptable (GRAP SIM + SYN ACC),

3.13 the number of errors which are semantically and syntactically acceptable (SEM + SYN ACC),

3.14 the number of errors which have high graphic similarity and are semantically and syntactically acceptable (GRAP SIM + SEM + SYN ACC).

Simple t-tests were again employed to test Hypothesis 3.10.

The mean scores, standard deviations, and t-values for the categories devised to measure the integration of information from two or more cue systems are depicted in Table 6.

No significant differences in means were noted between the good and the poor readers on any of the variables constructed to determine the degree to which readers were able to integrate information from two or more cue systems. Therefore, Hypothesis 3.10 could not be accepted on the basis of the statistical analyses carried out on the data.

It appears that both groups of readers integrate information from the three cue systems investigated in the study, and that the groups do not differ in their ability to integrate this information. It should be noted, however, that there was significantly more

Table 6

Mean Scores, Standard Deviations, and t-Values for the Variables Assessing Integration of Information from Two or More Cue Systems (N = 30, df = 28).

Categories of errors	Good Readers Mean	S.D.	Poor Readers Mean	S.D.	t-value	P (one-tail)
GRAP SIM + SEM ACC *	4.60	1.76	5.00	3.18	-.4255	.3369
GRAP SIM + SYN ACC	14.13	2.75	13.87	3.68	.2248	.4119
SEM + SYN ACC	11.60	4.53	12.60	4.91	-.5796	.2834
GRAP SIM + SEM + SYN ACC *	4.60	1.76	5.00	3.18	-.4255	.3369

* It can be noted from Table 6 that the poor group's variance on these variables almost doubled that of the good readers. Results from the F-tests, used to evaluate the homogeneity of the variance of the two samples, indicated a significant difference in the amount of variance in the scores of the two groups ($F = 3.2569$, $p = 0.035$). Consequently, Welch t-tests were computed on these two variables (df = 22.98). Due to redundancy in the two starred categories, the F-values were the same.

variability in the scores among the scores of the poor readers than of the good readers, in relation to the degree to which information from all three cue systems was integrated.

CORRECTIONAL BEHAVIOUR

In order to determine if there were differences in the correctional behaviour of good and poor readers, Hypothesis 4.10 was formulated.

Hypothesis 4.10

The good readers will make significantly more corrections than will the poor readers in terms of

4.11 the total number of errors which are corrected,

4.12 the type of errors which are corrected with regard to

- (a) the proportion of graphically dissimilar errors which are corrected,
- (b) the proportion of syntactically unacceptable errors which are corrected,
- (c) the proportion of semantically unacceptable errors which are corrected.

The mean scores, standard deviations, and t-values for the categories designed to measure correctional behaviour are reported in Table 7.

The results indicate that there is a difference significant at the .05 level between good and poor readers in relation to the number of errors which were corrected. No differences were noted, however, between good and poor readers in the proportion of either graphically dissimilar errors which were corrected, or syntactically unacceptable errors which were corrected. A significant difference was noted for semantically unacceptable errors corrected.

While Hypotheses 4.12 (a) and 4.12 (b) could not be accepted, Hypotheses 4.11 and 4.12 (c) were accepted on the basis of the

Table 7

Mean Scores, Standard Deviations, and t-Values for the Categories Assessing the Number and Type of Errors Corrected (N = 30, df = 28)

Errors Corrected	Good Readers Mean	Good Readers S.D.	Poor Readers Mean	Poor Readers S.D.	t-value	P (one-tail)
Total *	19.20	5.97	14.73	7.61	1.7888	.0423
Graphically Dissimilar **	.4518	.1727	.3593	.1952	1.3889	.0879
Syntactically Unacceptable **	.5015	.1889	.3976	.1920	1.4947	.0730
Semantically Unacceptable **	.4328	.1275	.3319	.1676	1.8567	.0370

* raw scores

** proportion scores

statistical analyses carried out on the data.

These results suggest that good readers, while not making significantly fewer errors than poor readers, correct more of their errors than do the poor readers. When the type of error corrected is examined, it is the category of semantically unacceptable errors that indicates a significant difference in correctional behaviour. This category would appear to evaluate the reader's sensitivity to the author's intended meaning. Hence, good readers would seem to be more concerned about the retention of passage meaning, or at least better able to detect (and correct) when an error violates the passage meaning.

INTERRELATIONSHIPS AMONG VARIABLES

Because integration of information was an important variable in this study, it was felt that correlation information might be useful. Consequently, Pearson product moment correlation coefficients were computed for both independent and dependent variables for each group of readers. These will be presented in four subsections. The first will deal with the relationships of the independent variables, i.e. reading comprehension and intellectual ability, with the dependent variables in the study. The remaining sections will discuss inter-relationships among the dependent variables.

Since it was noted earlier in this chapter that redundancies exist between four of the categories, those categories measuring the same information will be conflated and reported as one in this section. Therefore, the two categories assessing the integration of semantic and syntactic information (Semantic Acceptability and Syntactic and

Semantic Acceptability) will be reported under Syntactic and Semantic Acceptability. Those two categories measuring the integration of graphic, syntactic, and semantic information (Graphic Similarity and Semantic Acceptability and Graphic Similarity and Syntactic and Semantic Acceptability) will be reported as Graphic Similarity, Syntactic and Semantic Acceptability.

Reading Comprehension and Intellectual Ability

The two independent variables in this study were reading comprehension and intellectual ability.

The Pearson product moment correlation coefficients for both groups for the relationships of reading comprehension with the dependent variables are presented in Table 8.

For the good readers there were two significant relationships between Reading Comprehension and the dependent variables. A moderate positive relationship was found between Reading Comprehension and Syntactic and Semantic Acceptability ($r = .575$). It appears that students who made oral reading errors which were consistent with passage meaning also made higher scores on silent reading comprehension tests. Similar results were found for the poor readers, although they did not reach significance. A negative relationship was found between Reading Comprehension and Miscues Per Hundred Words ($r = -.502$, $p = .057$) for the good readers. While not reaching significance, this relationship suggests that for the good readers there was a tendency for an increase in Miscues Per Hundred Words to be associated with a lower reading comprehension score.

For the poor readers there was only one significant

Table 8

Pearson Product Moment Correlation Coefficients for Reading Comprehension with the Dependent Variables

Dependent Variables	Reading Comprehension	
	Good Readers	Poor Readers
Graphic Similarity	-0.363	-0.178
Syntactic Acceptability	0.364	0.119
GRAP SIM + SYN ACC	-0.127	-0.180
SYN + SEM ACC	0.575*	0.438
GRAP SIM + SYN + SEM ACC	0.279	0.223
M.P.H.W.	-0.502	-0.260
Total Corrections	0.139	-0.393
Graphically Dissimilar Errors Corrected	0.094	-0.279
Syntactically Unacceptable Errors Corrected	0.384	-0.532*
Semantically Unacceptable Errors Corrected	0.198	-0.395

* Significance at the .05 level of confidence.

relationship between Reading Comprehension and the proportion of syntactically unacceptable errors which were corrected. This relationship would suggest that an increase in the correction of syntactically unacceptable sentences tended to predict a lower comprehension score.

This last relationship is interesting. One would tend to predict positive relationships between Reading Comprehension and the four variables dealing with correctional behaviour, as there were for the good readers in all instances. All four correctional variables, however, were negatively related with reading comprehension scores for the poor readers, though only one reached statistical significance. This suggests that for poor readers, correctional behaviour, especially of syntactically unacceptable errors, was associated with lower reading comprehension scores. One possible explanation for these qualitative differences in reading behaviour for good and poor readers is that the poor readers, in concentrating on the production of grammatically acceptable patterns, were less able to reconstruct meaning.

The second independent variable of the study was intellectual ability. No significant relationships were found between intellectual ability and the dependent variables.

Amount and Integration of Information from Cue Systems

Pearson product moment correlation coefficients were calculated on the three variables concerning information from specific cue systems (Graphic Similarity, Syntactic Acceptability, and Semantic

Acceptability).

The correlation coefficients are presented in Table 9.

Table 9

Pearson Product Moment Correlation Coefficients for the Variables Concerning the Amount of Information Used from the Cue Systems

	Syntactic Acceptability		Semantic Acceptability	
	Good	Poor	Good	Poor
Graphic Similarity	-.520*	-.445	-.396	-.499
Syntactic Acceptability			.412	.407

* Significance at the .05 level of confidence.

For the good readers, Graphic Similarity was found to have a significant negative correlation with Syntactic Acceptability ($r = -.520$). This suggests that the more graphic information used by this group the less syntactic information was used (and vice versa). While a similar relationship was indicated for the poor readers ($r = -.445$), it did not reach statistical significance.

Negative relationships were also apparent between Graphic Similarity and Semantic Acceptability, although neither reached statistical significance. However, the direction of the relationship between Syntactic Acceptability and Semantic Acceptability was reversed. Though these positive correlation coefficients did not reach statistical significance, they reflect the fact that syntactic acceptability is a component of the category designed to measure semantic acceptability.

Oral Reading Accuracy

Pearson product moment correlation coefficients were calculated between the variable designed to determine oral reading accuracy -- Miscues Per Hundred Words -- and the other dependent variables. Correlation coefficients for selected variables are presented in Table 10.

No significant relationships of these variables with Miscues Per Hundred Words were apparent for the poor readers. However, for the good readers, scores on Miscues Per Hundred Words were significantly related to Syntactic and Semantic Acceptability ($r = -.571$). This relationship indicates that for the good readers, the production of a greater number of errors acceptable with the passage context tends to be associated with higher oral reading accuracy. One could predict that if a reader were making fewer errors, he would be able to attend more to the reconstruction of the author's meaning and consequently would make more errors which were acceptable with the passage meaning. The direction of this relationship was the same for the poor readers but it did not have the strength of that of the good readers.

Also significant is the negative relationship between Miscues Per Hundred Words and Total Corrections ($r = -.536$). This finding suggests that correctional behaviour is associated with a lower number of errors. It is not unreasonable to find this relationship, for one could predict that the more a reader miscues, the harder it would be to retain the meaning of the passage and in turn the more difficult it would be to correct errors. This is assuming that correctional behaviour is in part an effort to retain the reader's perceived meaning of a passage.

Table 10

Pearson Product Moment Correlation Coefficients for MPHW with Selected Dependent Variables

Categories of Errors	M.P.H.W. Good Readers	Poor Readers
Graphic Similarity	.095	-.072
Syntactic Acceptability	-.256	.005
Syntactic and Semantic Acceptability	-.571*	-.096
Graphic Similarity and Syntactic Acceptability	.095	-.181
Graphic Similarity and Syntactic and Semantic Acceptability	-.480	-.046
Total Corrections	-.536*	-.197
Graphically Dissimilar Errors Corrected	-.516*	-.208
Syntactically Unacceptable Errors Corrected	-.615*	-.114
Semantically Unacceptable Errors Corrected	-.601*	-.180

* Significance at the .05 level of confidence.

When the relationships between the types of errors corrected and Miscues Per Hundred Words is examined, similar trends can be noted (due to the interrelationships between the category of number of errors and those types of errors). However, it can be noted that the relationships are stronger for the errors relating to syntax and semantics than they are for those errors relating to graphic information ($r = -.516$ for graphically dissimilar errors corrected, $r = -.615$ for syntactically unacceptable errors corrected, and $r = -.601$ for semantically unacceptable errors corrected). One could again predict that it would be more difficult to correct errors involving grammatical structure or meaning when making more errors because acceptability of these types of errors is determined at the sentence and passage level, respectively, rather than at the word level. As was mentioned previously, while the correlation coefficients indicated the same direction of relationship for the poor readers, the relationships did not reach significance.

CORRECTIONAL VARIABLES

In order to determine relationships among the variables which focussed on correctional behaviour and the other dependent variables, Pearson product moment correlation coefficients were computed. These are depicted in Table 11.

The results from Table 11 indicate that there were no significant relationships for the poor readers between correctional behaviour and the use or integration of information from the cue systems.

It can be noted, however, that four significant relationships are apparent for the group of good readers. The ability to integrate information from the three cue systems -- graphic, syntactic and

Table 11

Pearson Product Moment Correlation Coefficients for Correctional Behaviour with Use and Integration of Cue Systems

Category of Errors	Errors Corrected: Total		Graphically Dissimilar		Syntactically Unacceptable		Semantically Unacceptable	
	Good	Poor	Good	Poor	Good	Poor	Good	Poor
Graphic Similarity	-.120	-.199	-.061	-.030	-.085	-.033	-.104	-.040
Syntactic Acceptability	.124	-.262	.226	-.325	.330	-.021	.068	-.236
GRAP SIM + SYN ACC	.051	-.093	.195	.167	.161	.209	.043	.091
SYN + SEM ACC	.254	.031	.174	.060	.254	.158	.279	.028
GRAP SIM + SYN + SEM ACC	.680**	.009	.668**	.259	.606*	.296	.707**	.178

* Significant at the .05 level of confidence.

** Significant at the .01 level of confidence.

semantic -- was positively related with the total number of errors corrected ($r = .680$, $p < .01$), graphically dissimilar errors which were corrected ($r = .668$, $p < .01$), syntactically unacceptable errors which were corrected ($r = .606$, $p < .05$), and semantically unacceptable errors which were corrected ($r = .707$, $p < .01$).

These results are important in relation to identifying differences between good and poor readers. The integration of information from the three cue systems would seem to be an indication of highly developed reading strategies. It is interesting that for the good readers only this integration variable correlated strongly with all the variables dealing with corrections, and most strongly with the correction of semantically unacceptable errors. Corrections are viewed by the investigator as a way to tap the reader's sensitivity to restoring the author's intended meaning. Hence, these results suggest that the more a good reader is able to integrate information from the three cue systems, the more he is able to monitor his responses in terms of passage meaning.

This correlational information is consistent with t-test comparisons of good and poor readers on correctional behaviour. Good readers were found to make more corrections than the poor readers, especially when the errors made were semantically anomalous. It appears, then, that the good readers in this study had developed patterns of reading behaviour which enhanced their ability to concentrate on the reconstruction of meaning or, conversely, to avoid potential meaning loss. These patterns of reading behaviour were not observed for the poor readers.

SUMMARY

Oral reading errors of good and poor readers were analysed in terms of oral reading accuracy, use and integration of information from specific cue systems (graphic, syntactic, and semantic), and correctional behaviour.

In relation to oral reading accuracy, on the basis of the number of miscues made per hundred words and an informal assessment of comprehension, it was determined that four of the subjects were reading material at frustration level. It did appear, though, that the rest of the sample read materials at an appropriate level of difficulty. However, there was no significant difference between good and poor readers in their mean scores on Miscues Per Hundred Words.

The results indicate that good and poor readers both used and integrated information from the three cue systems. Again, there were no significant differences between the mean scores of the proficiency groups on the variables concerning amount or integration of information from the cue systems. It was apparent, though, that on one variable, concerning the integration of information from the graphic, syntactic, and semantic cue systems, that there was more variance in the scores for the poor readers than for the good. This indicates that some poor readers were less able to integrate information than were others.

Correctional behaviour revealed significant differences between good and poor readers in the number of errors corrected and in the proportion of semantically unacceptable errors corrected. These

results suggest that although there were no significant differences in the number of errors made by the good and poor readers, good readers may be better able to detect and correct errors which are not acceptable with passage meaning.

Pearson product moment correlation coefficients indicated that there were more than three times as many significant relationships for the good readers as for the poor readers among the variables examined in the study. Of special note were the following relationships for the good readers: reading comprehension was positively related to the production of errors acceptable with passage context; an increase in errors (M.P.H.W.) related negatively to correctional behaviour and the number of contextually acceptable errors; and that correctional behaviour correlated positively with errors showing integration of graphic, syntactic and semantic information. A significant negative relationship for the poor readers was found between the correction of syntactically unacceptable errors and reading comprehension. These results suggest that the good readers, not only correct more errors than the poor readers, but also have patterns of reading behaviour which would appear to enhance their ability to reconstruct meaning.

Chapter 5

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

This chapter will present a brief summary of the study and a discussion of the findings and conclusions as they relate to the research reported. The findings and conclusions will be discussed under five main headings: oral reading accuracy; the amount of information used from specific cue systems; integration of information from specific cue systems; correctional behaviour; and interrelationships among variables. Implications for reading instruction will be discussed and then suggestions for further research will be made.

SUMMARY OF THE STUDY

The purpose of this study was to investigate the differences in oral reading behaviour of good and poor readers.

The test sample of 15 grade four students and 15 grade six students was drawn from three schools in the Edmonton Separate School System. The initial test population was comprised of 61 fourth-grade students and 100 sixth-grade students. The New Developmental Reading Test, Form A(1968), was administered to all of the students. Fifteen grade six students and 15 grade four students, having a General Comprehension score between 4.0 and 5.5 on this test, were selected for the test sample. The Canadian Lorge-Thorndike Intelligence Test, the Weschler Intelligence Scale for Children, and the SRA Primary Test of Mental Abilities were used to screen subjects for the sample, so that students scoring below 80 or above 110 were excluded. The 15

grade six students comprised the group of poor readers, while the group of good readers was composed of the 15 grade four students.

Two reading passages from the Reading Miscue Inventory (1972) (one at the fourth and one at the fifth to sixth-grade level) were administered individually to each of the fifteen subjects in each group. The oral productions were taped and the reading errors were transcribed from the cassette tapes onto copies of the passages and also onto scoring sheets.

The first 50 miscues were selected for each subject. Each error was subsequently analysed in terms of ten categories designed to evaluate the amount of graphic, syntactic, and semantic information processed, the integration of information from two or more cue systems, and correctional behaviour. In addition, the number of miscues per hundred words was calculated for each subject.

The statistical treatment of the data included t-tests, F-tests, and Pearson product moment correlation coefficients.

MAJOR CONCLUSIONS: ORAL READING ACCURACY

When good and poor readers were compared on their oral reading accuracy, no significant difference was noted between the mean scores for the groups.

Previous research findings have not been consistent on the differences in oral reading accuracy of good and poor readers. Clay (1968), Weber (1970), and Swanson (1937) noted that poor readers made more errors than good readers, though in these studies, the good and poor readers were not of a comparable level of reading achievement. The results of the studies by K. Goodman and Burke (1973) and Brody

(1973), where attempts were made to control for the level of reading achievement of the groups being compared, also generally indicated that there were differences between good and poor readers on the number of miscues per hundred words, with the good readers making fewer errors. One exception was noted in the Goodman and Burke study, however, where groups of readers were not found to be different in oral reading accuracy. The authors noted that the passage was relatively easy for the groups to read.

The findings of the present study appear to be inconsistent with most of the findings of earlier studies on oral reading behaviour. At least two factors may account for this. Firstly, the studies cited above did not employ statistical analysis of their data so that apparent differences may not have been statistically significant. Secondly, the level of difficulty of the oral reading passages may not have been constant for all subjects in relation to their level of reading achievement, resulting in differences in oral reading accuracy.

MAJOR CONCLUSIONS: AMOUNT OF INFORMATION USED FROM THE SPECIFIC CUE SYSTEMS

When good and poor readers were compared on their use of information from specific cue systems (graphic, syntactic, and semantic), no significant differences between the means of the groups were noted. The discussion of this finding will be presented separately for each cue system.

Graphic Cue System

The findings from other research on good and poor readers' use of graphic information have been inconclusive. The studies by Clay

(1968) and Y. Goodman (1967) suggest that at the beginning level, better readers use more information from the grapho-phonic cue system than do poor readers. K. Goodman and Burke (1973) found no difference in good and poor readers' use of graphic information except for the low second graders. These subjects were not able to use graphic information as well as the other grade and proficiency groups in the study. Therefore, it appears that at the beginning stages of reading, use of graphic information is a discriminating factor in good and poor readers.

Beyond the beginning level, however, results have been far less clearcut. K. Goodman and Burke (1973) found no difference between reading proficiency groups from the upper elementary to high school levels in the amount of graphic information used. Jensen (1972) and Brody (1973), however, did find differences in readers at the upper elementary level. The findings from Jensen's study indicated that good readers used less graphic information than the poor readers, while Brody's findings suggested that the good readers used more graphic information. Again, because statistical analysis was not carried out on the data, these differences could not be statistically assessed.

Information from the Syntactic Cue Systems

This study found no significant difference between good and poor readers in their use of syntactic information. These findings are not consistent with the results from research on beginning readers. Y. Goodman (1967) and Weber (1970) both found differences in first graders' abilities to process syntactic information; good readers used more syntactic information than did the poor readers. However, these

findings do support results of Brody's study (1973) (no difference between good and poor readers) though K. Goodman and Burke (1973) and Jensen (1972) found that good readers produced more syntactically acceptable errors than did the poor readers. Again, without statistical analysis, it is difficult to compare their results with those in this study.

Information from the Semantic Cue System

In this study, no significant difference was noted between good and poor readers in their use of semantic information. The findings from research by Swanson (1937) and Fairbanks (1937) indicated that poor readers' errors tended to alter the meaning of the passage significantly, while those of the good readers did not. Jensen (1972), investigating upper elementary readers' behaviour, also reported that the good readers' substitutions (at the word level) showed more relation to the text than did those of the poor readers, and K. Goodman and Burke (1973), examining elementary to high school readers' behaviour, found that good readers made more semantically acceptable errors than did the poor readers. Brody (1973), in her investigation of upper elementary readers' behaviour, on the other hand, found no difference between good and poor readers on the number of errors resulting in meaning loss (i.e. were semantically unacceptable).

It would appear, then, that the results of this study are consistent only with Brody's findings. The arguments may again be raised, that many of the previous research studies did not attempt to ensure that the level of difficulty was equal for both groups of readers and also, that the differences found were not evaluated

statistically.

MAJOR CONCLUSIONS: INTEGRATION OF INFORMATION USED FROM THE CUE SYSTEMS

No significant differences were noted between good and poor readers when their ability to integrate information from the cue systems was compared.

Several of the research studies cited earlier on oral reading behaviour revealed differences between good and poor readers in relation to the integration of information from two or more cue systems. Investigating beginning readers, Clay (1968) and Biemiller (1970) commented on the ability of higher achieving readers to integrate information from the three cue systems. Weber (1970), as well, noted the inability of a low group of first graders to integrate grammatical and graphic information, while Y. Goodman (1967) noted better readers' ability to integrate syntactic and semantic information. Studies comparing good and poor readers beyond the beginning level have also cited integration as a problem for poor readers. Because of the interrelationships between syntax and semantics in the Goodman Taxonomy, the category of semantic acceptability in fact reflects the integration of information from both the syntactic and semantic cue systems. Consequently, results from the K. Goodman and Burke (1973) study, and Jensen's study (1972) would appear to suggest that good readers are better able to integrate information from these two cue systems than are the poor readers. However, the one study by Pacl (1977), which used statistical analysis, did not note significant differences between good and poor readers in the category which coded contextual appropriateness, a rating which combined the effects of

syntax and semantics.

The findings of the present study are not consistent with much of the previous research, except for the one study which employed statistical analysis. Poor readers were not found to be statistically different in ability to integrate information. On the variable which evaluated the integration of information from all three cue systems, however, the poor readers indicated almost twice the variability in scores as did the good readers. Hence, it may be that a sub-group of the poor readers had difficulty with integration of information. Conversely, another sub-group of poor readers may have been proficient in this ability, as the difference between the mean scores for good and poor readers was not significant. Hence, inability to integrate information from two or more cue systems may be an important differentiating factor for some poor readers.

Again, the inconsistency of results in this study with those in others may involve the level of difficulty of the reading passages. It is possible that the breakdown in the integration of the cue systems for problem readers in other studies resulted from presenting them with material that was too hard for them.

MAJOR CONCLUSIONS: CORRECTIONAL BEHAVIOUR

Both the number and kind of corrections made by the readers were investigated. The findings indicated that the good readers corrected significantly more errors than the poor readers. When the kind of errors which were corrected was examined, it was apparent that the difference in correctional behaviour was due to the good readers' ability to correct semantically unacceptable errors. These results

suggest that the good readers are better able to retain the author's intended meaning, as they are able to successfully correct those errors which are not acceptable in terms of passage meaning.

Both of these results support the findings of previous research. Clay (1968) noted better readers, at the beginning stages of reading, corrected a larger percentage of their errors, and Swanson (1937) and Fairbanks (1937) identified substantial differences in favour of good readers at the college level. K. Goodman and Burke (1973) found in comparing different proficiency groups, that good readers corrected a higher percentage of errors.

The findings that good readers corrected a higher proportion of semantically unacceptable errors is related to K. Goodman and Burke's (1973) comprehending rating. While this category included the number of semantically acceptable errors, corrections of semantically unacceptable errors were counted as well. Since good readers consistently scored higher on this comprehending rating (in the 1973 study), one would infer that their ability to correct this type of error was a contributing factor to their superior performance.

This finding also relates to Hood's category of Meaning Loss, used by Pacl (1977). This category involves contextually unacceptable errors which were not corrected. Poor readers were found to make significantly more errors of this type. It would seem that this category is similar to that of Semantically Unacceptable Errors Corrected, though it is stated from the opposite perspective (i.e. uncorrected versus corrected).

MAJOR CONCLUSIONS: INTERRELATIONSHIPS AMONG THE VARIABLES

While the relationships tested by the Pearson product moment correlation coefficients were not related directly to any of the research hypotheses, they did provide additional statistical information concerning differences between good and poor readers.

Certain relationships among variables revealed noteworthy differences in patterns of responding between the two groups. For the good readers, a significant positive relationship was found between the integration of syntactic and semantic information and scores on reading comprehension, and between the integration of graphic, syntactic, and semantic information and the correction of all types of errors. A negative relationship was noted between the number of corrections and the number of errors made per hundred words. For the poor readers, a significant negative relationship was noted between the correction of syntactically unacceptable errors and reading comprehension.

The results indicated moreover, that there was significantly more interfacilitation of information and strategies for the good readers than for the poor. This was reflected in the fact that more than three times as many significant relationships were apparent for the good readers than for the poor (30 versus nine).

These findings support those reported by Guthrie (1973), who notes that scores on phonic subskills were highly correlated for good readers, but largely insignificant for disabled readers. While Guthrie examined phonic subskills only, this study investigating oral reading behaviour (in context) confirmed the tendency for strategies to be

more highly integrated for good readers than for poor readers.

IMPLICATIONS FOR READING INSTRUCTION

This study found no significant differences between good and poor readers in the number of errors made per hundred words, the amount of information used from specific cue systems, or in the integration of information from two or more cue systems. Significant differences were noted in the number of corrections made and, more specifically, in the proportion of semantically unacceptable errors which were corrected.

These findings have implications for the identification and remediation of disabled readers, as well as for general reading instruction. The results of this study can not easily be generalized to a population different from that used in this study, though the findings did support those of previous research with regard to correctional behaviour.

In terms of reading diagnosis, the findings suggest that particular attention should be paid to the students' ability to detect and successfully correct semantically anomalous errors. This variable not only differentiated good and poor readers, but was also significantly related to integration strategies. With regard to corrective and remedial instruction, emphasis should be placed on the subjects' monitoring of responses to ensure that the author's intended meaning is retained. For both general and remedial reading instruction, it appears that correctional behaviour should be encouraged. Since it was noted that a negative relationship existed between the correction of grammatically unacceptable errors and reading

comprehension, the emphasis in teaching correcting strategies should be placed on meaning.

The findings did not suggest that more attention should be paid by teachers to the teaching of word analysis skills or that poor readers should endeavour to make fewer errors. The findings of this study, moreover, would suggest a heavy emphasis on reading comprehension, rather than on word analysis or oral reading accuracy. Also, K. Goodman's hypothesis that all readers make miscues, all of which are not detrimental to the process of reconstructing the author's intended message, appears to have been confirmed from the findings of this study.

Finally, the technique of analysing oral reading behaviour was employed in this study to give some indication of how readers were processing print. It would appear to be a useful tool to be used by classroom teachers in the diagnostic teaching of reading.

LIMITATIONS OF THE STUDY

In addition to those limitations of the study cited in chapter one, the following limitations became apparent during the progress of the study:

1. It was intended that all subjects in the study be given material at their instructional level. An effort was made to select students whose reading comprehension scores on a standardized test were at the fourth grade level or above. The first oral reading passage selected was reported to have a readability level of grade four or below and therefore it was assumed that appropriate

materials would be provided for all the subjects. However, the results of the scores on the category of Miscues Per Hundred Words and an informal assessment of their comprehension, indicated that four students were reading at frustration level.

2. It became apparent during the analysis of the data that two of the categories constructed for the purpose of coding the errors were redundant. The category of Syntactic and Semantic Acceptability was identical to that of Semantic Acceptability and the categories of Graphic Similarity and Semantic Acceptability and Graphic Similarity and Syntactic and Semantic Acceptability were identical. This redundancy arose because in order for a miscue to be classified as semantically acceptable, it must also have syntactic acceptability. In addition to the needless repetition involved in the coding and analysis of the data and in the reporting of the findings, another obvious weakness is revealed. The semantic constraints operating in the language could not be separated from the syntactic constraints.
3. There was more variability in the scores of the poor readers than the good readers. It should be noted that the intelligence test scores for the fourth graders were obtained more recently than for the sixth graders. Hence, the scores of the sixth graders may have been somewhat less reliable than those for the fourth graders and this may have contributed to greater variability among the

scores of the sixth graders.

SUGGESTIONS FOR FURTHER RESEARCH

A sample of thirty good and poor readers from grades four and six, respectively, were selected for this study. Consequently, the study could be replicated with a larger sample. This would permit statistical analysis to determine if the variability in the performance of the poor readers was due to individuals or if discrete sub-groups of poor readers could be identified.

Whereas the present study investigated good and poor readers having a reading achievement score (as judged by a general comprehension rating) ranging from 4.0 to 5.5, further studies could investigate the differences in good and poor readers at other levels of reading achievement. This would be particularly interesting at the beginning stages of reading where research studies have suggested differences between proficiency groups on oral reading accuracy, use of graphic information, and integration of information from two or more cue systems. Since these earlier studies did not ensure the same level of difficulty for all groups, a study which did control for this factor would be extremely useful in adding information on beginning readers' strategies for processing print.

This study did not attempt to assess in any depth the differences in reading comprehension as evaluated by the subjects' retelling of passages read. This could be investigated and related to the oral reading behaviour of good and poor readers.

No attempt was made to examine the differences between good and poor readers on silent reading behaviour or to compare strategies

of good and poor readers on oral and silent reading tasks. While the cloze technique would be limited to evaluating the ability of readers to use contextual constraints, this could be an area for profitable research. Readers could be evaluated on their ability to integrate information from cue systems and their correctional behaviour in a silent reading situation.

The findings of this study suggest that differences between good and poor readers involve the ability to correct errors. Differences which have been found in other studies in accuracy, and in use or integration of information may not have emerged in this study because the material presented a similar degree of difficulty for both groups. A study which systematically compared good and poor readers (of comparable reading achievement) on independent, instructional and frustration level materials is needed to isolate and identify the effects of the difficulty of the reading passage on the strategies of good and poor readers.

CONCLUDING STATEMENT

This study used the analysis of oral reading errors to attempt to identify differences between good and poor readers in relation to the way they processed print. Categories were devised to evaluate the number of errors made (per hundred words), the amount and integration of information used from the graphic, syntactic and semantic cue systems, and both the number and nature of corrections made.

The results suggest that good readers make more corrections than poor readers, particularly in relation to errors which are not

acceptable with passage meaning. This suggests that the good readers have developed strategies to enhance their ability to reconstruct and retain the author's intended meaning.

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APPENDIX A

Directions for the Oral Reading Test

DIRECTIONS

I want to see how you read so I have two stories for you to read out loud. After you read a story, I will ask you to tell me as much as you can about what you read.

While you are reading I will record on this paper the way in which you read and how long it takes you to read. I will also be taping on the tape recorder so that I can listen again to make sure that I have everything copied down.

Before we start I would like you to say your name, your school, and what grade you're in so we can make sure the tape recorder is working. [Do so.]

This is the first story, "Space Pet". Read here and here [indicating appropriate pages], etc. Read out loud and tell me about it when you've finished.

O.K. you may start now. [Record oral reading.]

Good. Now, can you tell me about the story? [Write down response.] Anything else? Is that all?

Thank you very much.